THE MAC Flyer

October 1985

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THE MAC Flyer

For Greater Safety in MAC Air Operations

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Sammy's Dilemma

Hi! As some of you may be aware, I'm Capt. L.S. (Long Suffering) Sam. Many of you know me as C.R. Terror's competent copilot. Well, I've got a problem. For the past 31 years I've devoted my life to keeping Major "T" out of trouble both in the air and on the ground, and I think I'm approaching burn-out. So far, Blinky, Max, Ty and I have managed to prevent a major mishap (no pun intended), but I just can't handle it much longer. I need *your* help! I've tried and tried to find a way to make the Ace of Airlift more safety conscious and at last, I think I might have found one—with your help, that is.

Every month, Major Terror waits with bated breath for the latest issue of *The MAC Flyer* to arrive in the squadron. Naturally, he loves to read about himself, even though the articles are often somewhat less than flattering. But occasionally he will break down and read an eye-catching safety article other than *C.R. Terror*, and, believe it or not, it *has* made him a safer pilot. That's where you come in. It's time to prepare for the *1986* MAC Flight Safety Writing Contest. The editors of this publication and I need you to write a masterful piece of literature guaranteed to grab the Rhinestone Flyboy's attention and stimulate him to think *SAFETY!* Remember though, in order to help the crew, your submission must present a safety message. If you do this for me, I'll see to it that the editors send you your very own copy of *The MAC Flyer*, delivered directly to your door, every month for the next year (in a plain brown wrapper of course). And that's just for entering! If you win, and 12 talented writers will, the rewards are even greater. Your masterpiece will be published in *The MAC Flyer*. The top three winners will receive an engraved desk set and the remainder will receive an engraved plaque. With your own copy of *TMF*, you'll be able to follow Major "T" and company as we aviate our way around the world. And hopefully, with your help, we'll be around a lot longer to educate and entertain you. Just follow the simple rules below.

THE RULES

The 1986 MAC Flight Safety Writing Contest is conducted according to MACR 900-3 and these rules. All entries must be original, unpublished and postmarked no later than 31 March 1986. Stories must be between 1,000 and 3,000 words long (about 6 to 14 double-spaced typed pages). Poetry should be about 75 to 100 lines. Entries must contain an *aviation safety/mishap prevention message*. Manuscripts must be double-spaced, typed and submitted in two copies. Identify entries by title only and attach a cover sheet showing the author's name, address, duty phone number and unit. The cover sheet must contain a brief autobiography.

The contest is open to anyone. Entries qualifying under the above rules earn their author a free one-year subscription to *The MAC Flyer*. However, contest prizes (desk sets and plaques) may only be awarded to military members and civilian employees of the Department of the Air Force or Air Reserve Forces. Other entrants may be selected for Honorable Mention in a special category. All winning stories will be published in *The MAC Flyer*. Entries should be addressed to:

Flight Safety Writing Contest
HQ MAC/IGFE
SCOTT AFB, IL 62225-5101

TMF Interview

Meet the New Director of Safety

Col. Richard W. Blatter, MAC Director of Safety

(*Editor's Note:* Col. Richard W. Blatter became the MAC Director of Safety earlier this year. Before his selection as Director of Safety, he served as the Deputy Director. In this candid interview he shares some of his views on Safety.)

***TMF*—Col Blatter, will you share with us some of your airlift background?**

Col Blatter—I came into airlift from SAC, where I flew tankers. I went into C-130s when TAC still owned the tactical airlift mission. That was in the mid-sixties. I served three tours in C-130s and later I flew CT-39s. During my line flying, I had the opportunity to fly a wide range of airlift missions in the C-130. I gained a great deal of experience in tactical airlift, but I also flew SAAMs and channels, and that was an excellent opportunity to experience the different phases of the airlift mission. My C-130 assignments included Pope, Ching Chuan Kang, Taiwan and Little Rock. I was also fortunate enough to command the 16th Tactical Airlift Training Squadron at Little Rock, which conducts all C-130 Phase I training for the Department of Defense. This gave me considerable background in MAC's formal training programs. I've got almost 6,000 flying hours with 3,500 hours in the C-130.

***TMF*—You've served as a commander and as a safety staff officer. What do you consider our biggest asset in mishap prevention?**

Col Blatter—Our biggest asset is the combination of individual discipline and acceptance of personal and professional responsibility reinforced with strong leadership and supervision. I'm talking about everyone in MAC. Our regulations, our concept of operation, and our concept of leadership and supervision are sound. As long as we all apply that individual discipline and assume our personal responsibility to get the job done right, we will continue to improve mishap prevention.

***TMF*—Then, considering individual discipline or acceptance of personal responsibility as our greatest asset, how do we promote it?**

Col Blatter—The best way, in my view, is for everyone, from the commanders on down, to encourage strong leadership and supervision and clearly emphasize the need for individual discipline and responsibility. We must continue to apply leadership in a very straightforward manner in order to emphasize, or have success in, those areas. Visible leadership and supervision at all levels are essential.

***TMF*—We just finished the CINCMAC-directed C-130 Executive Review and we are in the process of making some changes. How do you see these changes affecting our safety program?**

Col Blatter—I think there are three areas that will be most improved as a result of the changes recommended during the Executive Review. These changes, when implemented, will increase our basic flying skills, our crew

coordination and our cockpit leadership. It was a very successful forum for identifying and attacking problems identified by the safety investigation boards of each of the seven Class A mishaps.

***TMF*—MAC has now provided microcomputers for its safety offices. What do you feel will be the greatest impact of this new addition?**

Col Blatter—This year we had 31 Z-100 microcomputers delivered to safety offices throughout the command. We plan to have our MAC safety computer net completed and working with full capability by January 1986. This will be at our safety offices, wing level and above, and will cover all safety disciplines. With the help of several of our computer experts in the field and in the MAC Safety Directorate, we have also developed two safety software programs—one for flight safety data and one for ground safety data. In May we sent our first program into the field and we are continuing to develop more software programs. The application of this system will allow our safety people to be more versatile, flexible and efficient in doing their jobs. Initially this system will be time intensive but, in the long run, once we learn how to use it effectively, we will save time. For example, they'll be able to compose reports on the Z-100 and transmit them to the MAC computer. The time saved will free the safety staffs to spend more time on the line pursuing mishap prevention.

***TMF*—What qualities would you recommend commanders look for when selecting a safety officer, NCO or civilian?**

Col Blatter—I would look for the most credible, knowledgeable, and proficient people—officers, NCOs and civilians. I would pick people who can go out and be at home on the flight line or in the squadron; someone who can be at ease with everyone, no matter who they are, new or experienced; an individual who can communicate, and who has the idea that he or she is a mission oriented safety person. They're out there to support the commander and the commander's safety program. We all must be aggressive in doing that.

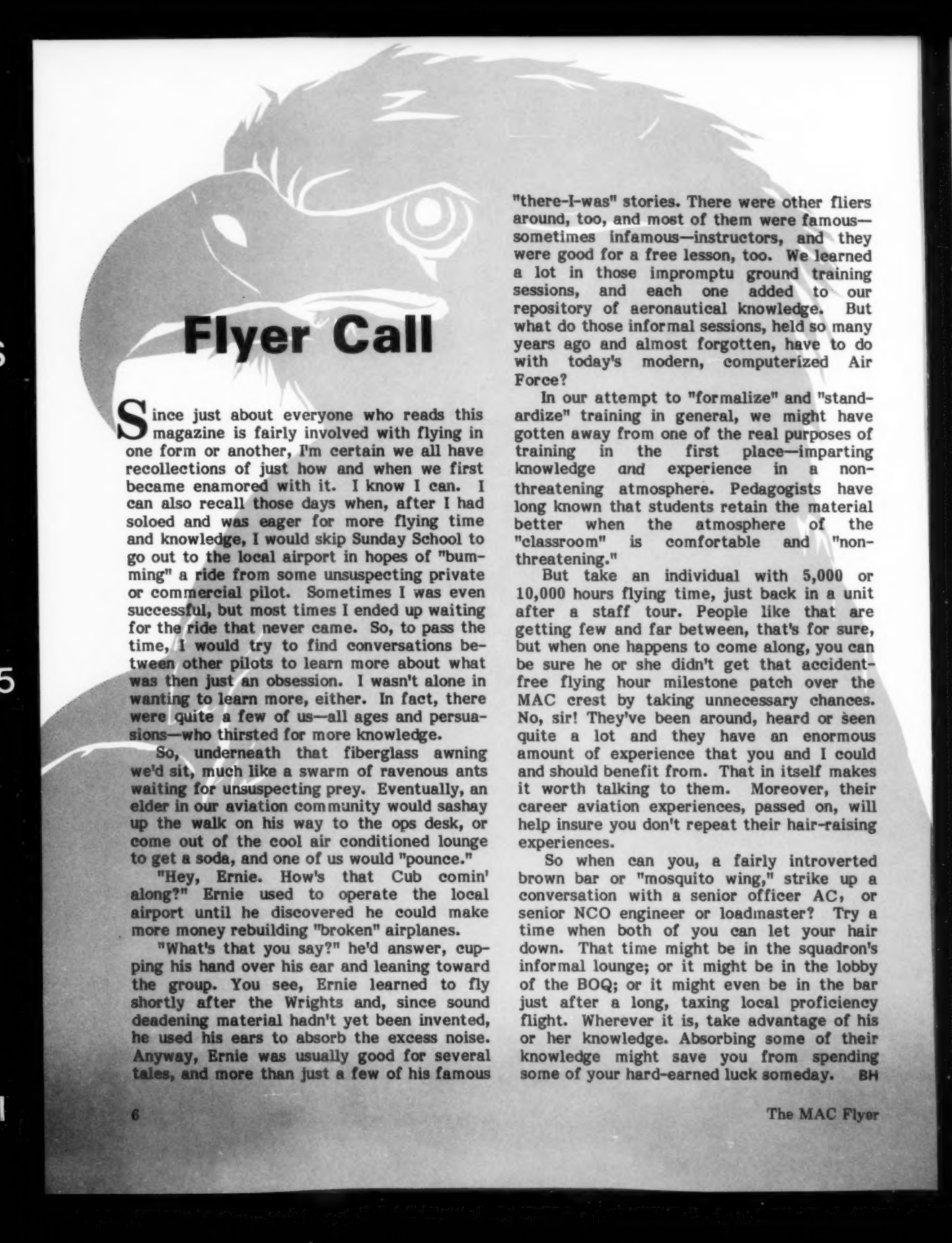
***TMF*—What advice can you offer commanders in handling the increased risk, perceived and real, associated with the increased tasking during ORIs and contingency deployments?**

Col Blatter—My safety advice to the commander is: Be *the* leading safety officer in your organization. The commander should be the best safety officer in the outfit. Make it clear to everyone that it's most important to think and act safely as a matter of routine and habit. The alternative is to lose people or equipment—that equates to loss of combat capability.

***TMF*—What will be the focus of your efforts as the Director of Safety?**

Col Blatter—I want to focus on the importance of leadership and supervision in our safety programs. We need to continue to have full, active and aggressive support from our commanders and supervisors at all levels. I want to emphasize efficient operations within all safety offices in the command. I want to make it clear that if we operate safely, we are going to be more capable of completing our mission, because we're not going to lose those people or that equipment. There's a little bit of safety philosophy that applies to this issue, and it has to do with peacetime safety and wartime safety. There should be no difference. Military Airlift Command trains everyday for our wartime mission. What we do everyday is what we will be doing, on a different level and different intensity, during wartime. Fatigue is ever present and manifests itself even more in a combat situation. We're going to be working our people and equipment at higher levels so, when when we go to war, we have a continuing need to operate safely. We are going to need every person, every aircraft and every piece of equipment even more during wartime than we do in peacetime. This same principle applies to an ORI. We should operate the same way in an ORI as we do day-to-day. In wartime we will need the people, we will need the equipment, and the demands will be even greater.

***TMF*—Thank you for sharing your thoughts and time with us, sir.**



Flyer Call

Since just about everyone who reads this magazine is fairly involved with flying in one form or another, I'm certain we all have recollections of just how and when we first became enamored with it. I know I can. I can also recall those days when, after I had soloed and was eager for more flying time and knowledge, I would skip Sunday School to go out to the local airport in hopes of "bumming" a ride from some unsuspecting private or commercial pilot. Sometimes I was even successful, but most times I ended up waiting for the ride that never came. So, to pass the time, I would try to find conversations between other pilots to learn more about what was then just an obsession. I wasn't alone in wanting to learn more, either. In fact, there were quite a few of us—all ages and persuasions—who thirsted for more knowledge.

So, underneath that fiberglass awning we'd sit, much like a swarm of ravenous ants waiting for unsuspecting prey. Eventually, an elder in our aviation community would sashay up the walk on his way to the ops desk, or come out of the cool air conditioned lounge to get a soda, and one of us would "pounce."

"Hey, Ernie. How's that Cub comin' along?" Ernie used to operate the local airport until he discovered he could make more money rebuilding "broken" airplanes.

"What's that you say?" he'd answer, cupping his hand over his ear and leaning toward the group. You see, Ernie learned to fly shortly after the Wrights and, since sound deadening material hadn't yet been invented, he used his ears to absorb the excess noise. Anyway, Ernie was usually good for several tales, and more than just a few of his famous "there-I-was" stories. There were other fliers around, too, and most of them were famous—sometimes infamous—instructors, and they were good for a free lesson, too. We learned a lot in those impromptu ground training sessions, and each one added to our repository of aeronautical knowledge. But what do those informal sessions, held so many years ago and almost forgotten, have to do with today's modern, computerized Air Force?

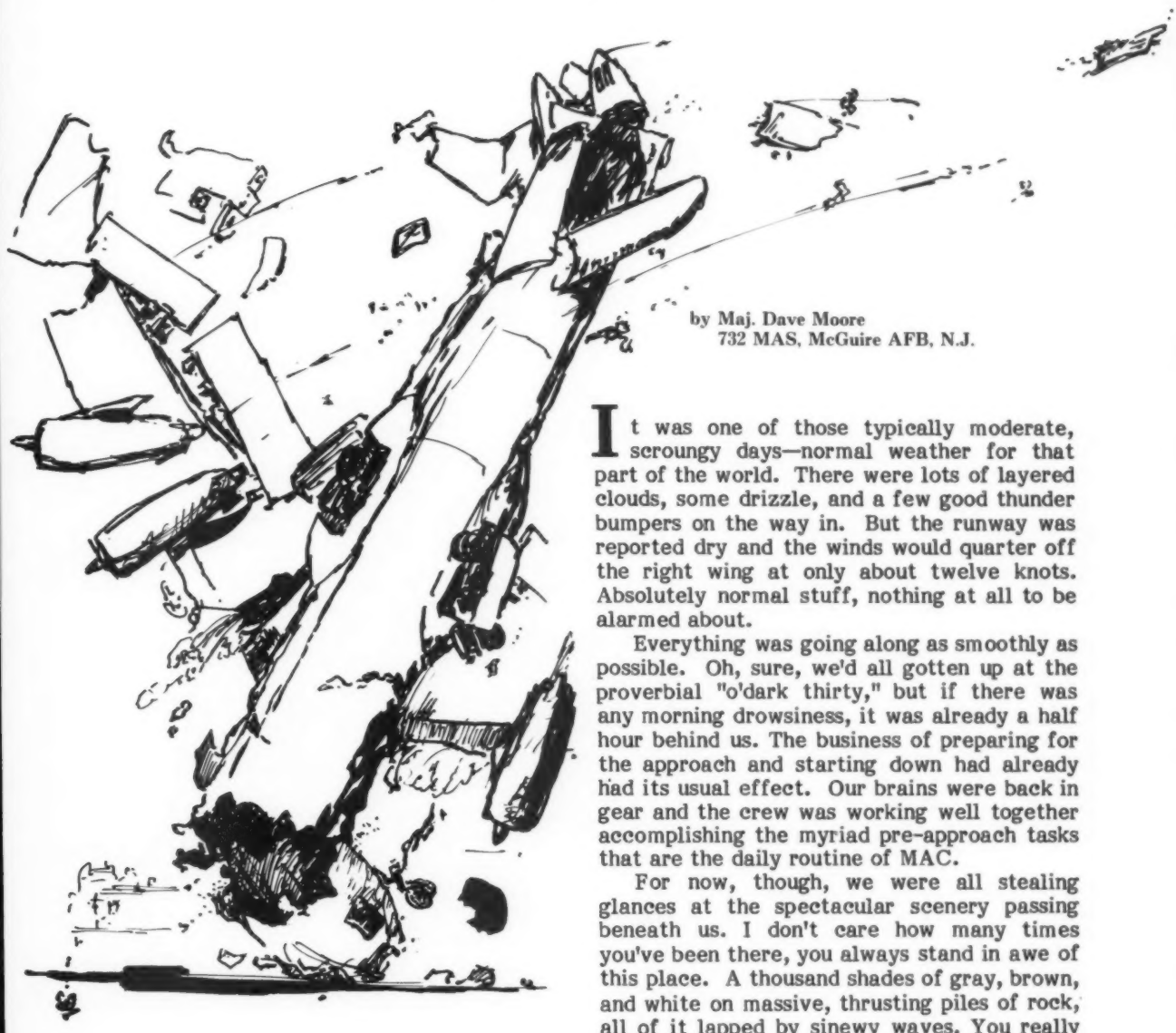
In our attempt to "formalize" and "standardize" training in general, we might have gotten away from one of the real purposes of training in the first place—imparting knowledge *and* experience in a non-threatening atmosphere. Pedagogists have long known that students retain the material better when the atmosphere of the "classroom" is comfortable and "non-threatening."

But take an individual with 5,000 or 10,000 hours flying time, just back in a unit after a staff tour. People like that are getting few and far between, that's for sure, but when one happens to come along, you can be sure he or she didn't get that accident-free flying hour milestone patch over the MAC crest by taking unnecessary chances. No, sir! They've been around, heard or seen quite a lot and they have an enormous amount of experience that you and I could and should benefit from. That in itself makes it worth talking to them. Moreover, their career aviation experiences, passed on, will help insure you don't repeat their hair-raising experiences.

So when can you, a fairly introverted brown bar or "mosquito wing," strike up a conversation with a senior officer AC, or senior NCO engineer or loadmaster? Try a time when both of you can let your hair down. That time might be in the squadron's informal lounge; or it might be in the lobby of the BOQ; or it might even be in the bar just after a long, taxing local proficiency flight. Wherever it is, take advantage of his or her knowledge. Absorbing some of their knowledge might save you from spending some of your hard-earned luck someday. **BH**

Finding of Cause

Hindsight is *always* 20/20



by Maj. Dave Moore
732 MAS, McGuire AFB, N.J.

It was one of those typically moderate, scroungy days—normal weather for that part of the world. There were lots of layered clouds, some drizzle, and a few good thunder bumpers on the way in. But the runway was reported dry and the winds would quarter off the right wing at only about twelve knots. Absolutely normal stuff, nothing at all to be alarmed about.

Everything was going along as smoothly as possible. Oh, sure, we'd all gotten up at the proverbial "o'dark thirty," but if there was any morning drowsiness, it was already a half hour behind us. The business of preparing for the approach and starting down had already had its usual effect. Our brains were back in gear and the crew was working well together accomplishing the myriad pre-approach tasks that are the daily routine of MAC.

For now, though, we were all stealing glances at the spectacular scenery passing beneath us. I don't care how many times you've been there, you always stand in awe of this place. A thousand shades of gray, brown, and white on massive, thrusting piles of rock, all of it lapped by sinewy waves. You really understand how insignificant you are in the

Honorable Mention 1985 Flight Safety Writing Contest

grand scheme of things when you look at something as awesome as that. All of us, in our own way, felt grateful for our chance to see it once again.

So everything was going great. Final approach was normal. The touchdown was right on speed, on the numbers. I put the throttles into idle reverse and called for the spoilers just before nosewheel contact. I sensed the copilot reaching over to the spoiler handle and got that little surge against the harness you feel when decelerating.

Then all hell broke loose! It all happened so fast. I mean, you couldn't keep up with it all, it was happening so fast; everything changed so rapidly.

But now, so many years later, I've watched it on the "super slo-mo" a hundred times over. You see, we've all got really great wide screens up here. What the other guys watch on theirs is their business. But me, I can't help it. I'm still too haunted by those old tapes to put them away for good yet. And yeah, the tapes show it all, from about ten different camera angles, whichever way you want to look at it.

Everytime I watch it, I rack my brain wondering what I could have done differently. Maybe if I'd tried to keep the airplane on the ground . . . . But that's all Monday morning quarterbacking now.

Anyhow, let me replay it for you. Yeah, here's the spot. See here? Sure enough, the spoilers came out practically to the ground limit. This closeup of the indicator shows an even deployment on the inboards. (Remember your systems?)

But this is it, right here! See, right here, at almost full extension, somehow an asymmetry must have been sensed on the outboard torque tubes, and that's when the spoilers started to automatically retract, just like they were designed to do. But look at the split on that gauge as they come in! The panels on the left side are closing much faster than the ones on the right. Why, I don't know, but that's what initiated the whole . . . ah . . . "event."

When the spoilers came back in, I could feel the airplane lighten up, and the asymmetrical nature of the retraction instantly threw us violently into a 20° right bank. Unfortunately, nature tossed us a curve right at the same moment. A little gust (it didn't have to be a lot), from the right caught that big T-tail broadside, twisting the airplane around even more to the right.

It's not instantaneous

and it's not painless.

It hurts a lot.

I threw the yoke to the left to try and straighten her out, wondering what was going on. My first thought, half-doubtful, illogical, was that something was wrong with the reversers, so I brought the throttles back forward over the gate. I didn't have the time to look at the reverser lights. I was "eyes outside," just trying to keep the metal side up. But now the spoilers—both sides—had fully retracted, and my work on the yoke only resulted in an equally violent lurch 17° to the left.

You get the picture. *Everything in the air had gone great. Everything on the ground was going wrong.* The airplane was in a dangerous dance, and why I hadn't heard the scrape of a wingtip or pod yet, I didn't know. So I decided to take it around and try to gather my wits back in the air where everything had been fine.

But watch this. Let me back the tape up just a bit. Now let's play it again. There, the spoilers are coming out . . . now, they retract asymmetrically and we start gyrating all over the place. I bring the throttles out of reverse and turn the yoke over, and . . . *there*, that's it, right there! Right at that point the copilot, wondering why the airplane has gone crazy right after *he's* done something, looks down and sees that the spoiler indicator is showing "closed." So he reacts! In the rush of the moment, oblivious to what I'm doing, he does just what he's been trained, or conditioned to do. Without thinking, or maybe thinking badly, *he resets the spoiler handle and deploys the spoilers a second time.*

Too bad. By now, as you can see, I'm advancing the power to go around EPR. But with that second spoiler deployment, the nose is pitching up unexpectedly.

Crew coordination, you say? Listen, you've got the luxury of minutes to analyze this. We had split seconds. So what do you mean, "Did I announce 'emergency go around'?" What kind of voice would you have had if your heart was in the middle of your throat like mine was?

But at that point, what would it have mattered anyhow? The spoilers were going to retract in any case, whether they retracted automatically because of either the asymmetry circuitry or the 54° degree forward throttle switch or retracted manually on my command. The bottom line is that the left side came in *again* much faster than the

With the nose up, all that induced drag, full power, and momentary asymmetric lift, there was no way I could hold it. I just wasn't expecting it. I thought I had it under control, by now. I was too surprised, too stunned. The left wing swung way up, over, over, over, and the right wing tip caught. That was it!

Whatever they tell you, let me set you straight. It's not instantaneous, and it's not painless. It hurts a lot. But it's more than physical. It's a mental and moral hurt. You regret all the things you hadn't thought to say to your family and friends before you left--all those things that will never get said now. But most of all, you're painfully sorry to have failed. You blame yourself for letting it get out of your hands, even though it was somehow beyond your control. If only one less thing had gone wrong at that one critical instant . . . .

But up here you get over it after awhile. Well, I mean, not totally. It is kind of galling sometimes. I have it from our monitoring sources up here (which are impeccable, as you know) that they never really did figure out what caused the airplane to cartwheel. Something about visual illusions; about the unusual slope of the field making us think that the end of the runway was coming up, and that we stalled out attempting a simple go-around. Yeah, that was the accident board's finding: An inexcusably botched up performance of an erroneously chosen maneuver.

I mean, give me a break! Maybe I wasn't a veteran, but then I wasn't just a green kid either! Don't get me wrong, it's not that I'm excusing myself. Maybe I could have done better, I admit it. It's just that they don't understand the why of it, the why, why . . . .

And that's what bothers me most, not the speculations or aspersions, but the fact that it could happen again to somebody else back down there. That whole set of circumstances is waiting to bite again because nobody understands what really happened to us.

There has to be some way to let them know. I have got to find a way to tell them!

Author's Note--This story is of course fictional, but the author has personally experienced an asymmetry trip and subsequent retraction event which resulted in momentary heart-stopping bank excursions on the runway. Three other crews have experienced similar events. The results of these occurrences were obviously not as catastrophic as those in the preceding fictional tale. Nevertheless, the moral is apparent: Take heed, it could happen to you.

Major Moore was commissioned from the U.S. Air Force Academy in 1968. He has flown as an aircraft commander in both the C-130 and C-141 including a tour in South East Asia. He is currently flying the C-141 with the 732 MAS, McGuire AFB, N.J. and flying as a Boeing 727 first-officer for American Airlines.

"We've Got A Fire in the Cabin!"

Saudia Airlines, the national flag carrier for Saudi Arabia, has operated the Lockheed L-1011 safely for many years. That enviable safety record came to a tragic end one night in mid-August 1980. Saudia's Flight SV163 was a regularly scheduled passenger flight from Karachi, Pakistan, to Jeddah, Saudi Arabia, with an enroute stop at Riyadh. The flight from Karachi to Riyadh was uneventful, and at 1808Z (2108 local time), SV163 took off for Jeddah.

Less than seven minutes after takeoff, the crew received both aural and visual warnings of smoke in the aft cargo compartment, or C-3. It took the crew almost five minutes to confirm the warning while climbing to their assigned cruise altitude of 35,000 feet. Twelve minutes after takeoff, the crew confirmed the fire warning was authentic and turned back to Riyadh. The crew was 78 miles from the airport when they turned around. When queried about the reason for their return, the captain replied, "We've got fire in the cabin, please alert the fire trucks."

About this time, the flight engineer returned to the cockpit from his second inspection of the cabin. He informed the captain there was only smoke in the aft portion of the aircraft. Minutes later, another aural smoke detector warning came on. Then, as the captain retarded the power,

he noticed the number-two throttle lever was sticking. As he was about to shut down the engine, a flight attendant came into the cockpit and told the crew there was now a fire in the cabin. She tried to go to the back, but returned to the cockpit advising, "There is no way I can go to the back of 2L and 2R (the middle emergency escape exits) because the people are fighting in the aisles."

By now, the crew was aware of the severity of their emergency, but still didn't react with the urgency the situation warranted. By 1829Z, the cabin was filled with smoke and the crew had received several more smoke warnings. All the while, the cockpit voice recorder was recording the flight attendants' voices as they tried to calm the passengers.

Finally, at 1835Z, or about 20 minutes after the first warning, SV163 landed on Riyadh's runway 01. From the first indication of smoke through final roll out, the captain flew the aircraft and made all decisions concerning the disposition of the flight. Now, after safely landing the stricken craft, he let the big trijet slowly roll out to the end of the runway, turning off onto the taxiway at the end. There was never any indication he tried to stop the aircraft on the runway or pull off onto a taxiway prior to the end. This cost an additional two minutes and 40 seconds.

The tower controller asked the captain if he wanted to continue to the ramp or shut down on the taxiway. The captain responded, "Affirmative, we are trying to evacuate now." That was the last transmission the tower received. At 1842Z, some three minutes and 15 seconds after the aircraft came to a stop on the taxiway, and almost seven minutes after it landed, the firemen noted the engines were shut down.

Now, the firemen tried to enter the cabin. They didn't get in until 1905Z, *23 minutes after the engines were shut down.* By this time, the fire's intensity made entry into the cabin impossible, and the fire soon engulfed the aft fuselage.

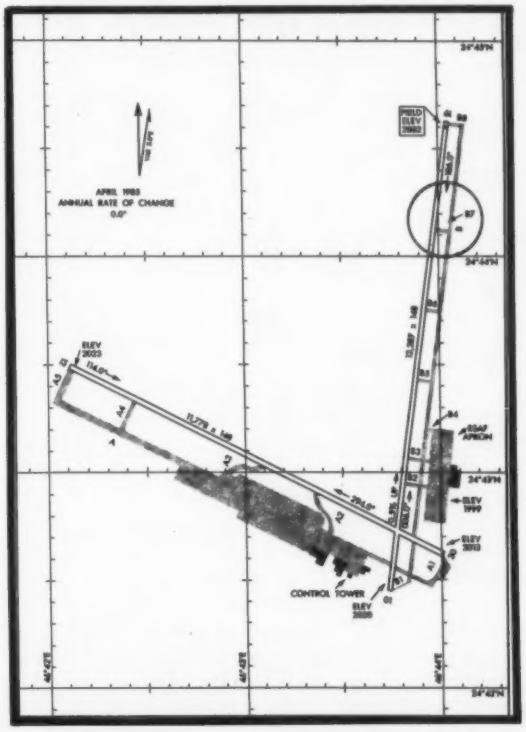
When the firemen finally extinguished the blaze, all 301 people on board SV163 were dead. None of the bodies showed evidence of impact or crushing type injuries as you might expect to find in a panic situation. Instead, all deaths were from smoke inhalation and burns. The captain and his first officer were found still in their seats.

The aircraft was substantially damaged in the fire. The upper fuselage was consumed, especially in the cockpit and passenger areas.

Analysis

First of all, the crewmembers were all properly certified for the flight and received the training required by Saudia. The 38-year-old captain had worked for Saudia since 1965, and had over 7,600 flying hours, with 388 in the L-1011. His records indicated difficulty

Airfield depiction showing the B-7 turn off. B-7 is 3,609 feet from the departure end of Runway 01.



in training throughout his career. He didn't like varying from a set pattern; he sometimes got "behind" the aircraft; he was very slow to learn and needed more training than normally required; and he had problems upgrading into the L-1011.

The first officer's records also showed some difficulty in the training progress. He was dropped from flight training in 1975 because of poor performance. He was reinstated in Saudia's pilot training program in 1977, and in 1978 was released to the line as a Boeing 737 first officer. On August 7, 1980, just 12 days before the mishap, he had qualified as an L-1011 first officer. At the time of the accident, he had a little over 1,600 hours, with 125 in the L-1011. He was 26 years old.

The 42-year-old flight engineer was hired in 1974. His record, too, showed something less than normal training progress. From July 1974 until early 1975, he flew as a DC-3 captain until his selection as a captain for the B-737. He made unsatisfactory progress at the United Airlines simulator training facility in Denver, Co., and Saudia elected to terminate his training. In 1977, he again tried to become a B-737 first officer, and this time he succeeded. He later failed a checkride and was released from further duties with Saudia.

A tenacious individual, though, he offered to pay for his own flight engineer training on a B-707. Saudia accepted his offer, and in January 1979, he was once again flying with the airline. In December of that year, he upgraded to flight engineer on the L-1011 and started flying the line in that capacity in May 1980.

Fire Origins

The Saudi Arabian Civil Aviation Investigation Board searched for the origin of the fire. Most of the evidence they found pointed to a fire starting in the rear baggage area, or C-3. First of all, the smoke detectors in C-3 gave the crew their first hint of smoke or fire. The flight engineer confirmed smoke in the cabin when he went back to investigate the warnings.

The stuck throttle lends support to the evidence. The throttle cable runs above C-3 and is susceptible to a fire originating in the cargo compartment. Temperatures in the area between the cargo compartment ceiling and cabin floor reached a peak just after the liner burned through, causing the floor to buckle and/or the cable to burn through, either of which could have caused the throttle to stick.

But there was more than enough time, from the first warning of smoke to actual landing for most, if not all, of the people on SV163 to have survived. Why, then, did they die?

a flash fire incapacitated the cockpit crew and attendants just after engine shutdown

Crew Coordination

After initial warning that a possible fire existed, the crew spent four minutes and 21 seconds confirming the warning. About three additional minutes went by before the crew found the aft cargo smoke warning procedure in the checklist. But even up to this time, the cockpit crew's actions can be considered normal. Thereafter, things began to deteriorate.

During descent, the captain appeared to devote his entire attention to flying the aircraft and making decisions. He might have reduced his workload by letting the first officer fly the plane while he did what he was paid to do—command and lead! This would have given him time to evaluate the extent of the emergency and prepare the crew for an immediate evacuation once they were on the ground. But the flight engineer may have contributed to the crew's overall confusion by underestimating the seriousness of the situation. He kept saying, "No problem," when in fact there was a very serious problem—this crew had a fire! He may have made himself believe everything would eventually work out, but his actions presented the captain with an incorrect view of what was actually happening.

The captain, however, should have

deduced there was a fire. If nothing else, the actions of the flight attendants alone should have prompted him to land the aircraft as soon as possible. He should have directed everyone on oxygen. There was no evidence that he ever did this.

The first officer didn't help the situation, either. He failed to assist the left-seater in assessing the condition of the aircraft. He didn't assert himself in a manner that would have prodded the captain into more positive action.

There is also the question of why the captain didn't elect to stop as soon as he could and evacuate the aircraft on the runway. Evidence supports the contention the aircraft could have been stopped on the runway, which would have saved about two minutes. Those two minutes turned out to be critical.

During the time the aircraft was "rolling out" to the end of runway 01, the flow of fresh air was reduced, depleting oxygen and increasing the proportion of toxic and combustible gases. These factors resulted in a flash fire which incapacitated both the cockpit crew and the flight attendants. The evidence points to their incapacitation just after engine shut down.

One witness, responding to a call from the tower, arrived at the airport as the aircraft was approaching the runway for landing. He stated that after the aircraft landed, he followed it down the runway and caught up with it as it passed the B-7 turn-off, 3,609 feet from the end of runway 01. (See diagram.) By that time, he stated, the aircraft was taxiing slowly and made a slow turn-off at the end of the runway. After SV163 stopped, the witness parked his car behind the aircraft, and observed fire through the windows on the left side of the cabin. He stated there was no one moving in the cabin or the cockpit.

Finally, just prior to landing, the captain told the cockpit crew not to evacuate. It isn't clear if this information was passed to the cabin crew. But even if it was passed to the flight attendants, they still had the authority under Saudia directives to initiate an evacuation, should the situation dictate.

Crash-Fire-Rescue

About the only positive thing that can be said about the crash-fire-rescue (CFR) personnel is that they were there. The investigation revealed they were poorly trained, disorganized, and inadequately equipped. They had neither the protective clothing nor the fire-fighting equipment necessary. They also didn't have the tools necessary to get inside the big L-1011. But even if they had, they hadn't been trained on an L-1011. Hampered by these limitations, the firefighters did the best they could.

Probable Cause

The Presidency of Civil Aviation determined the probable cause of this accident was the initiation of fire in the C-3 cargo compartment. The ignition source of the fire is undetermined. Factors contributing to the fatal results of the accident were: The failure of the captain to prepare the cabin crew for immediate evacuation upon landing; his failure to make a maximum stop landing on the runway with immediate evacuation; his failure to properly use the cockpit crewmembers throughout the emergency; and, the failure of the CFR headquarters management to ensure its people had adequate equipment and training to function as required during an emergency.

Applications to MAC

There was no reason for all, if any, of the people on this flight to have perished. There was plenty of time after the first indication that something wasn't right. The crew had time to thoroughly prepare themselves to get the airplane down safely and evacuate it quickly. Herein lies the lesson for us—If in command, *command!* If not in command, do your best to *assist* the commander. There's a very good reason why they put more than one person on a large, multi-engine aircraft. But it doesn't do a bit of good if the AC tries to fly solo.

Two of the hottest subjects in the command today are crew coordination and cockpit leadership. No matter what you call it, the reason we're part of a crew is our individual expertise and experience. Communicating that knowledge effectively and efficiently is an art we should be practicing on a day-to-day basis. Through practice, if we should ever find ourselves faced with just such an emergency, we'll be able to deal with it—and live!

Adapted from Flight Safety Focus

TMF Instrument Quiz

This month, we at *TMF* have decided to give you a shot at the dreaded Jeppesen approach chart. Good luck.

1. The effective date of the approach chart is _____.
- a. 1 Oct 84
- b. 12 Jul 85
- c. 1 Nov 84
- d. Not depicted

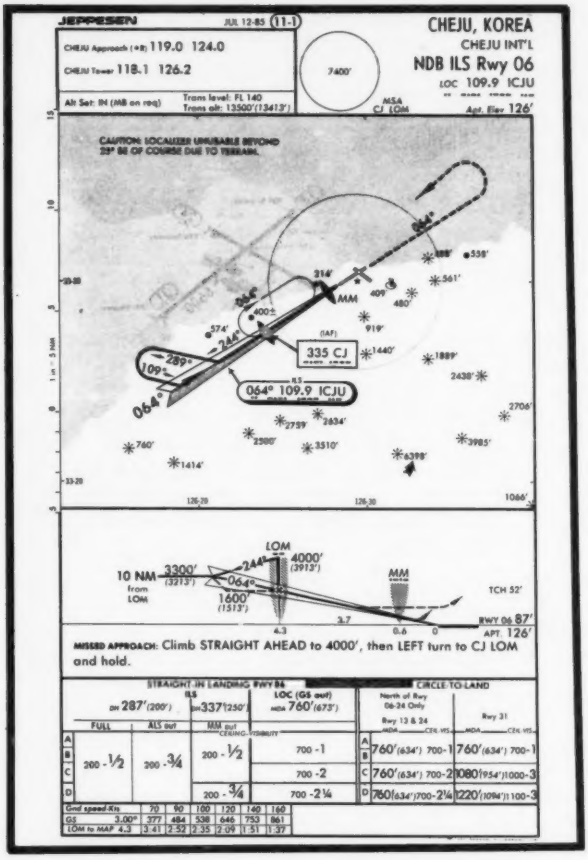
2. The minumum safe altitude while executing this approach is _____.
- a. 2,500 feet MSL
- b. 7,400 feet MSL
- c. 1,440 feet MSL
- d. 3,300 feet MSL

3. The transition altitude indicated on the approach chart is _____.
- a. 14,400 feet MSL
- b. 13,413 feet MSL
- c. FL140
- d. 13,500 feet MSL

4. The airport elevation at Cheju is _____.
- a. 126 feet
- b. 409 feet
- c. 64 feet
- d. 400 feet

5. The symbol (*R) in the upper-left corner of the approach chart indicates _____.
- a. Runway information is available on frequencies 119.0 and 124.0
- b. Radar service is available on a part-time basis
- c. Cheju approach is equipped only to receive on frequency 119.0
- d. Aircraft must receive Cheju Approach on frequency 119.0

6. The distance from CJ LOM to the missed approach point is _____.
- a. 3.7 statute miles
- b. 3.7 nautical miles
- c. 4.3 statute miles
- d. 4.3 nautical miles



7. The threshold crossing height is _____.
- a. 87 feet
- b. 126 feet
- c. 52 feet
- d. Not specified

8. The decision height for the ILS with the middle marker out of service is _____.
- a. 337 feet
- b. 287 feet
- c. 760 feet
- d. Not specified

9. Circling to land on runway 13 or 24 is only authorized _____.

a. South of runway 06-24
b. North of runway 06-24
c. During daylight hours
d. There are no circling restrictions specified

10. The MDA for circling to runway 31 for a category C aircraft is _____.
a. 760 feet MSL
b. 1,080 feet MSL
c. 1,220 feet MSL
d. 1,100 feet MSL

11. The ceiling and visibility requirements for the ILS runway 06 with the approach lighting system out are _____.
a. 200-1/2
b. 200-3/4
c. 700-1
d. 700-2

12. The glide path angle for the ILS approach is _____.
a. 2.5 degrees
b. 3.0 degrees
c. 3.5 degrees
d. Not specified

13. Using a 140 knot ground speed, the rate of descent to maintain the ILS glide slope is _____.
a. 538 feet per minute
b. 646 feet per minute
c. 753 feet per minute
d. 861 feet per minute

14. Using a 120 knot groundspeed, the time from the final approach fix to the missed approach point is _____.
a. 3:41
b. 2:52
c. 2:35
d. 2:09

15. The circle surrounding the aerodrome has a radius of _____ .
a. 10 nautical miles
b. 10 statute miles
c. 5 nautical miles
d. 5 statute miles

16. Only those features depicted within the aerodrome circle are to scale.
a. True
b. False

17. There is currently a DOD published NDB/ILS approach to runway 06 at Cheju Intl Airport; therefore, either the DOD approach chart or the Jeppesen approach chart may be used provided *all* approach restrictions for the selected approach are fully complied with.
a. True
b. False

ANSWERS

1. (b) The effective date of the approach chart may be found on the upper-center portion of the chart.
2. (b) The minimum safe altitude for each sector is depicted in the circle on the upper-center portion of the approach chart.
3. (d) The transition altitude and transition level are depicted on the upper-center portion of the approach chart.
4. (a) Airport elevation is found in the upper-right portion of the approach chart.
5. (b) The "*" symbol indicates part-time operation and the "R" symbol indicates radar service is available. Therefore, (*R) indicates radar service is available on a part-time basis.
6. (d) The distance from the FAF to the MAP is given in nautical miles and is depicted beneath the FAF on the profile view and in the lower-left corner of the approach chart.
7. (c) TCH is depicted on the right side of the profile view on the approach chart.
8. (a) DH for the ILS with no middle marker is depicted as part of the straight-in landing minima.
9. (b) Circling restrictions are indicated under the circle-to-land portion of the approach chart.
10. (b) The circle-to-land minimums are found in the lower-right portion of the approach chart.
11. (b) Weather requirements with no approach lighting may be found under ALS out on the lower-left portion of the approach chart.
12. (b) Glide slope angle is indicated on the lower-left portion of the approach chart.
13. (c) Descent rate for a given ground speed may be found using the chart on the lower-left portion of the approach chart.
14. (d) Time from the FAF to the MAP may be found using the chart on the lower-left portion of the approach chart.
15. (d) The circle surrounding the aerodrome has a radius of five statute miles.
16. (b) The reference circle is only used to emphasize obstructions and other information close to the airport.
17. (b) MACR 55XXX only allows use of Jeppesen, National Ocean Survey or Host government instrument products when an acceptable DOD FLIP (SID of Terminal Approach) is not available. Additionally, use of these alternate products must be approved by MAC AF.

When the Original Aviators Get Hold of a ...

Bird Article, One Each

by Capt. Donald L. Rosenberry
Associate Editor

Hey Tommy, 'ow ya doin' mate?"

"Well, if it isn't Charlie, the chunk-winged 'curl caller. You just get in?"

"Yep. Just flew in. Ya know, Melbourne is fine this time of year, but those crowds and marsupials really get to me after awhile."

"Yeah, I can relate to that. Too many pockets of trouble for me."

"Where's that little worm you were talking to last spring? Barney, I think his name was."

"Oh, he's out there trying to relearn how to fly. Spent too much time behind that desk, caused him to lose touch with reality. I never did trust them paper-pusher type fliers anyhow. They're always trying to find something they can print. Look here at this trash I found yesterday. Perfect example of the kind of low-rent vile garbage they'll publish. Just happened to see one o'my yunguns reading one of them HB's flight safety magazines. You try to keep that stuff away from them but, well, you know boys." *(Editor's Note*— HB=Human Being)

"That I do, Tommy. So it was one of them feather flashing rags, eh? Not to worry, it's just a stage."

"I guess yer right, but this was one of them I read regularly, a real quality publication, or so I thought. Right there between the weather article and that hysterical C.R. Terror fella is this totally unexpected, unspeakable filth! Makes me ill just thinking about it!"

IT'S OCTOBER AGAIN!

The Birds Are Back!

It's October again and that places us right in the middle of the fall bird migration season. Statistics attest, year after year, to the increased avian traffic from September through November in the form of bird-strikes. Not only that, but October turns out to be the worst month for aircraft-bird impacts. This isn't to suggest that you needn't worry about the birds all year long, but instead to highlight the additional danger they pose in the fall.

Birdstrikes are, of course, most common close to the ground, with over 80% of the strikes occurring during takeoffs and landings. This may result from their reaction to the increased noise as the aircraft approach. So we know to take special care during those phases, as well as during low-level training flights, but that hardly solves any problems. As the saying goes, "So now I know what's gonna hit me—big deal, it's *still* gonna hit me." Well, there are some things we aviators may be able to try in our effort to avoid getting too close to our feathered friends.

First, we can keep a good look out. If you can see them, as in large flocks, you can avoid them, sometimes. We can learn where the local bird types congregate and plan our low-level routes to avoid that area as much as possible. Just like any other threat, knowing where it is can be a big help in foiling its efforts to harm you.

Be aware of the four "flyways" birds normally use for their migratory treks. The Atlantic Flyway follows the East Coast. The Mississippi Flyway obviously incorporates the marshes of the Mississippi Valley and extends down to the gulf areas in Louisiana and Texas. The Central Flyway runs along the Missouri River and across the Middle US to the Gulf Coast of Texas. The Pacific Flyway generally follows the west coast, curving inland along the central valley in California, then down into Mexico.

If you are in line with a flock of birds, going over them may be more prudent. Birds tend to avoid a collision by diving or side-slipping to lose altitude. Should it appear a birdstrike is unavoidable, don't try any abrupt maneuvers, just maintain straight and level flight. The damage the bird will make when impacting the aircraft will be less if the surface location of impact isn't already under stress from your evasive action. If the bird is coming right at your windscreen, try to duck beneath the instrument panels (as if we needed to tell you). These foul creatures can make a permanent impression on you if they get the chance. If you see birds around an aerodrome, report it to the appropriate ATC agency for crosstell to other, less observant aircrews. If, after all your efforts, the beasts prang your machine anyway, make sure you report it to your flight safety officer, the information is very useful in the ongoing war with the winged!

"You've uh, piqued my curiosity there Tommy. Exactly what was the story? Let's have a look, eh?"

"Burns me up, I tell ya. Bad enough we have to put up with all their racket and harassment in the summer nesting areas, but now this."

"The article, Tommy. The article!"

"Oh, I burned the nude pictures of various species, but I assure you they were pure filth."

"You what, er, uh, good! I know what you mean, mate. I was just over at the Fish-n-Brew, and them HBs had a 40-inch obelisk with them two dimensional representations of themselves dancing all around, spewing some banal nonsense about 'bird problems.' Can you imagine?"

"Bingo. That's exactly it. There in the middle of the only HB pub I read is this graphic description of bird fatalities. Only to hear them tell it, you'd think those monstrous metal crafts were the victims. Remember that massacre last October?"

"Oh, yeah. Hundreds of the O'Clary family was wiped out, no motive they could ever establish. As I recall they just chalked it up to one mad HB vehicle. Pretty awesome. Took 'em out right in flight."

"That's right. Well this here mag had up close pictures of the O'Clarys right after the brutal slayings. They didn't even fade out the faces. There lay poor Jenny, all twisted and bloody. I...."

"There now, Tommy. You know they ain't got no scruples."

"That didn't bother me too much; I never did care for scruples, besides, who can eat after seeing *those* pictures? Anyway, I'm running an awareness campaign. I tell you them HBs will stop at nothing. They've got their youths believing we fowl are the real culprits. Take a look at this. It's typical of the yellow journalism propaganda trash they try to pass off as reality.

"You've got to be kiddin' me, Tommy. Who'd believe that stuff about foul creatures. What threat are they referring to anyway?"

"I sense a convert here. Join our group, Charlie, and help pass the word. Confrontations with these foreign invaders in *our* skies are getting more frequent and more serious. They just keep on getting bigger and multiplying. Only bird I ever knew that'd take on them boys was Slim, rest his soul."

"What happened, did they murder him too?"

"Nah, but he got his beak stuck in a limb after them HBs used some pyrotechniques on him. After that he took to drink and it finally did him in."

"That's pretty sad. What are we gonna do?"

"Charlie, the best thing we can do to keep from methodical extinction is to stay aware. We simply need to know when they fly, where they fly, and a little about their habit patterns, and we ought to be able to stay clear of them, for the most part. I guess there will always be a few impacts each year, but this wholesale destruction has got to stop!"

"I'd 'ave ta agree wi' ya, Tommy."

"Sheesh, I told you the accent has *got* to go, it just sounds weird coming from a New England type."

"Maybe so, but I've got to start now if it's gonna feel natural come next year's Strut-n-Crow contest. Will I see you and the li'l lady there?"

"You mean Sally? Nah, she went crazy trying to eat gummy worms last year. But you know me. I'll be there with somebody beautiful, even if I go alone!"

"Uh . . . Right, Tommy. See you next spring at Yore AFB."

Flying-Hour Milestones

10,000

Lt Col Wallace M. Morgan, Jr, 756 TAS
Lt Col Derel D. Schrock, 932 AAG
CMSgt Donald M. Galb, 300 MAS
CMSgt Donald M. Galbraith, 166 TAG
SMSgt Silas J. Williams, 300 MAS
MSgt Richard H. Harada, Jr, 166 TAG

5,000

Col Waldemar K. Kerbel, 732 MAS
Col Norman L. Pfeifer, 41 TAS
Maj William A. Cowgill, 928 TAG
Maj Robert E. Graf, Jr, 300 MAS
Maj Sylvester Hendrix, 16 TATS
Maj Jan M. Jobanek, 459 TAW
Maj Gene E. Lanier, 707 MAS
Maj Zachary T. Prescott, 732 MAS
Capt George A. Caldwell, 14 MAS
Capt Antonio Nazario, 39 TAS
Capt Sidney P. Vaught, 41 TAS
SMSgt Cecil D. Clark, 14 MAS
MSgt Alexander C. Cason, 181 TAS
MSgt Jackie T. Collins, 18 MAS
MSgt Dale E. Faulkner, 16 SOS
MSgt John H. Ford, Jr, 41 TAS
MSgt Clarence G. Hartis, 300 MAS
MSgt Vernon G. Hunter, 130 TAS
MSgt Archie R. Ingram, 928 TAG
MSgt Franklin K. Kerbel, 732 MAS
MSgt Jimmy L. Manhart, 14 MAS
MSgt Louis R. Palma, 328 TAS
MSgt George T. Pearce, 41 MAS
MSgt Larry E. Persing, 40 TAS
MSgt James H. Raley, 86 MAS
MSgt Edward E. Sear, 41 TAS
TSgt Armando Borunda, 15 MAS
TSgt Ricky W. Harris, 37 TAS
TSgt William B. Heaton, 15 MAS
TSgt Jerome E. Hodges, 345 TAS
TSgt David E. Jones, 3 MAS
TSgt Dennis L. Lenhart, 15 MAS
TSgt Thomas A. Scott, 181 TAS
TSgt Charles D. Spray, 1 SOS

2,500

Lt Col Michael N. Farage, Det 4, 40 ARRS/CC
Capt Michael J. Letica, HQ MAC/DOVS
1st Lt Martin A. Potter, 18 MAS
MSgt Gordon L. Williams, 20 SOS

Ranks and units are those at time of award. See MACR 900-3 for details on how to apply for your own milestone award.

A Prominent Doctor Addresses... Hypoxia

by Capt. Donald L. Rosenberry
Associate Editor

On an educational front, we had to do something drastic to turn the trend around. There were increasing numbers of physiological incidents, ranging in severity from mild symptoms of hypoxia to conditions requiring treatment in hyperbaric chambers. We decided to go all out and call in the amazing Professor Schliepforeber, a former instructor and self-proclaimed expert on the evolution of gases, and other things physiological. Born in Spitzbergen and raised in Tanzania by small sweaty creatures, he magnanimously offered to share his thoughts on these issues in an exclusive interview with *UnScientific America* magazine, who elected not to print the article.

USA: Professor, could you please tell us a little about some of the problems associated with the . . .

Schliepforeber: Good. I begin with hypoxia. This is a situation wherein the cells don't get enough oxygen. This impairs their function and keeps 'em from doing whatever they normally do. Now, there are many situations where an oxygen deficiency can occur, but those people who frequently ride around in those modified Budweiser cans are most concerned with those conditions causing a reduced partial pressure of oxygen. This, of course, represents a condition of extreme hazard, which can be dangerous.

USA: Just how dangerous is it?

Schliepforeber: What is this? Carson? Let me continue, Meatface. You guys ain't exactly paying top dollar, you know. The severity of the condition is aggravated by the fact that a mild degree of hypoxia, while not fatal in itself, may have fatal results by causing a critical deterioration in aircrew performance and maybe even making errors more likely.

USA: I see. Well, as hypoxia results from a decreased partial pressure of O_2, it would seem useful to calculate the partial pressure of oxygen (PIO_2) in the atmosphere for sea-level conditions as a baseline. Isn't there a formula which takes into account the fact that inspired gases are moisture-ridden? Something like $PAO_2 = (P_B - P_{WV}) \times \%O_2 - PACO_2$, (where P_{WV} is the water vapor pressure at deep body temperature)?

Schliepforeber: I always wondered what kind of self-praising, egotistical simpleton used those formulas in a supercillious effort to appear brighter in otherwise straightforward articles. The effect of decreased partial pressure of O_2 is to diminish the oxygen tension in the alveoli in the lungs. This, in turn, reduces the concentration of O_2 in the blood supplying the alveoli. The tissue cells, the O_2 users, get their supply through diffusion, obviously dependent on the gas tension gradients. As you Americans put it, "it flows downhill." If the input tension is reduced, then the pressure will be reduced at each level until finally there is inadequate tension at the cellular level to allow oxygen transfer. You get hypoxia.

USA: I understand there is a hidden complication regarding the effect of altitude on the quantity of O_2 the body's hemoglobin can transport. That there is a nonlinear relationship between PIO_2 and the maximum possible saturation of O_2 in the circulatory fluids.

Schliepforeber: You crack me up. Where'd you learn to talk? The amount of oxygen held by the blood depends directly on the barometric pressure which, of course, drops with altitude. The *rate* at which it drops is greater per 1,000 feet above 3,000 feet. It falls rapidly at altitudes above 10,000 feet.

USA: So that's why we have to wear the oxygen masks above 10,000 feet, right?

Schliepforeber: No, that equipment is put on the airplanes so aircrews can emulate the role models first proposed in the film "12 O'clock High." Of course it is! You know, you bring new insight to the argument over what constitutes "brain-death."

USA: Speaking of that, I understand brain cells and those areas of the brain associated

SYMPTONS OF HYPOXIA

1. Feeling tired or sleepy.
2. Headache.
3. Impaired judgement.
4. Light-headedness or dizziness
5. Visual disturbances.
6. Tingling hands and feet.
7. Loss of self-criticism.
8. Dulling of thought.
9. Depression and nausea.
10. Altered respiration.
11. Euphoria with outbursts of hilarity.
12. Pale skin, blue lips and finger nails.
13. Hearing depression.
14. Incoordination of limbs.
15. Disorientation.
16. Semi-consiousness.
17. Muscle spasms and convulsions.
18. Unconsciousness.

TABLE 1

with the powers of judgment, self-criticism and accurate mental task performance are adversely affected even at very low altitudes.

Schliepforeber: Correct. But this would have no effect on you whatsoever, because the low altitude referred to has nothing to do with gutters, and one must actually possess a living brain to suffer.

USA: Are there any particular altitudes associated with this condition?

Schliepforeber: The first symptoms of hypoxia, i.e., errors in judgement, are easily seen by an observer as low as 5,000 feet MSL. But this is the real problem. One of the dangers of hypoxia is that the person afflicted is unable to recognize the symptoms. In fact, they may actually feel they are performing better than usual, which would take no effort at all in your case.

USA: You mention errors in judgment. Are there other symptoms one might look for in an effort to identify early onset?

Schliepforeber: There's a long list of possible symptoms, which makes hypoxia even more insidious, and it can sneak up on you. You see, individual symptoms are exactly that—individual. Even you might get symptoms. Some of the more common complaints observed in controlled environments are listed in Table 1.

USA: Well then, it appears to me that all one need do is identify one's symptoms and when they occur, do something about them. Let's move on to . . .

Schliepforeber: Hold on, Vacuum Skull. It's not that simple. It isn't always a gradual problem, especially for those Icarus-imitating warriors who might read this, though once they see who's doing the interview, I suspect the audience will thin out a bit. There is always the possibility of a rapid decompression, suddenly you're at a much higher altitude.

USA: Big deal, what's the difference how fast you get there. I'm a little tired of listening to all that hype about aircraft performance. Time to climb records aren't really . . .

Schliepforeber: Careful, you're going out-of-body again. We're speaking of time of useful consciousness, of course. This refers to the amount of time in the oxygen deficient atmosphere in which you are aware of the environment, and capable of safely controlling your actions. In your case that's

TIME OF USEFUL CONSCIOUSNESS

ALTITUDE IN FEET	TUC MODERATE ACTIVITY	TUC SITTING QUIETLY
21,000	5 MINUTES	10 MINUTES
25,000	2 MINUTES	3 MINUTES
28,000	1 MINUTE	1½ MINUTES
30,000	45 SECONDS	1¼ MINUTES
35,000	30 SECONDS	45 SECONDS
40,000	18 SECONDS	30 SECONDS
66,000	12 SECONDS	12 SECONDS

TABLE 2

NOTE: Times may be cut in half in a rapid decompression.

zero even at sea level, but for the more normal folks, Table 2 lists some average values. These times are, however, just ballpark figures. They're different for everyone and can change day-to-day as well.

Additionally, there are factors which influence your tolerance to hypoxia.

USA: Oh, so there must also be ways to acclimate the body to the reduction in partial pressure of oxygen, like a period of sustained oxygen reduction before flight?

Schlieforeber: From you, I expected that. Anyway, one of the factors I spoke of is altitude, since as one climbs above 5,000 feet or so, oxygen must be added to the air to maintain sea-level O_2 pressure. Above 33,000 feet, even breathing pure O_2 isn't good enough, and you have to start using some means of positive pressure breathing.

USA: Okay, so you have to add in altitude. That still doesn't seem so difficult to predict.

Schliepforeber: Smoking also influences your tolerance to hypoxia. Heavy smoking introduces carbon monoxide into the bloodstream, so since a smoker is slightly hypoxic at sea level, obviously he, she or it will fare worse than a non-smoker at all altitudes. Also, smokers tend to increase their blood count to compensate for the carbon monoxide, it's the poor non-smoking co-pilot who sucks in all that unwanted smoke on the flight deck who really suffers.

USA: So if you're not a smoker the equation is pretty simple.

Schliepforeber: I always wondered what would happen if one's spinal fluid was replaced with a cheap grade motor oil, and now I see. There *is* more, and if you interrupt before I finish this time, I'll tell everyone about your drooling problem. Now, fatigue is also a significant factor, either mental or physical. If you're tired, you're already functioning a quart low, pretty normal for you. Exposure to extreme temperatures, high or low, tasks the body heavily, and that reduces your tolerance further. Physical exertion also increases the oxygen needs of the tissues, so this aggravates the situation if you're already in a low-oxygen environment. This is not to encourage a sedentary lifestyle; au contraire, the more physically fit you are, the more tolerant of hypoxia. Finally, drugs, including alcohol, decrease your tolerance and may aggravate your symptoms. But there's no way to know *how much* these factors will affect your tolerance anymore than you can know what your specific tolerance will be at any one time.

USA: As I expected, there's really no need to worry about this stuff anyway, since there's nothing I can do about it.

Schliepforeber: You're living testament to the damage not learning how to prevent this problem can cause. The obvious means of prevention is to maintain an adequate partial pressure of oxygen. Basically there are two solutions: Maintain sea-level cabin pressure or increase the proportion of oxygen in the air you're breathing (and the pressure above 33,000 feet). Be aware of hypoxia when you fly; it can begin gradually or rapidly. Know what to do if you recognize your symptoms of hypoxia, and then *do* something about them. Don't try to tough it out, or you might end up as an interviewer for *UnScientific America* magazine.

USA: So you're recommending total concentration on this diabolical problem during flight. We must overcome this problem!

Schliepforeber: Calm down! You certainly are easily persuaded. I'd hate to see the stuff you've ordered on the 1-800-lines. Besides you, I imagine most fliers have other things to do in flight, at least I hope so. The best method of prevention is education. The physiological training folks do a terrific job not only on hypoxia, but in many physiological areas of concern. When you're there, listen and learn. When or if you're ever faced with the situation, you'll more easily recognize it as a problem, either in yourself or others. More importantly, you'll know exactly what to do.

USA: Let's move on now to . . .

Schlipforeber: That's enough, @¢$!-for-

brains, I exceeded your capacity to learn after the first two lines, so I think you should just . . . .

We interrupt this interview to preserve our rating. Besides, the final eight pages only described various methods the professor felt the interviewer should consider for self-improvement, and some were indelicate. As the esteemed Professor Schliepforeber pointed out, enough information is available to identify hypoxia problems when possible, and about what to do to minimize the impact when it occurs. Physiological training, regulations and checklist procedures are the only tools we need to solve this problem. It's too late to learn after the fact, and you might not even get a second shot at it!

Care and Feeding of Copilots

This article is primarily directed toward the operators of multi-pilot aircraft and most of the information is directed toward how the aircraft commander should deal with his/her copilot. However, much of it also applies to dealings with navs, flight engineers, loadmasters and others. What we're really talking about is the individual who finds himself or herself in command of an aircraft and crew. A multi-person aircraft requires a special kind of coordination and communication. That communication includes both verbal and non-verbal exchanges between the two pilots, and that's the crux of this article. Having flown in several different aircraft (B-52, F-4, T-33, T-39), I'd like to share some thoughts about the treatment of an often berated minority group—copilots.

As an aircraft commander, you're automatically part instructor. You may not have the "K" prefix on your AFSC, but the copilot is your student and the kind of pilot he/she becomes, to a large degree, is up to you. My first and most important point is the age-old

leadership-by-example trick. It's going to be pretty difficult for you, as an AC (or IP), to credibly correct a violation of regulations or procedures if the "co" is following your bad examples from previous flights. So, the first rule in the proper care and feeding of copilots is: *Have YOUR act together!* A professional, knowledgeable aircraft commander sets the tone and standards for the entire crew, especially the copilot. Don't confuse that with acting dictatorial, tyrannical or obnoxious; I've met those three types also.

Part of the knowledge you must have stored in the memory of your mental computer is a thorough understanding of the duties and responsibilities of your copilot. I won't say you can't properly train and supervise a copilot if you haven't been there, but I will say it's an uphill battle. Either way, you need to know what's to be done by the right seater in order to guarantee maximum efficiency and safety up front. So, the second rule is: *Know the copilot's job!*

Next, I think one of the most important tasks (and often the hardest to remember) for an aircraft commander is to let the copilot do the job. Example: I think that a B-52 copilot has one of the most challenging and difficult right seat jobs in the USAF. The occupant is part flight mech, loadmaster, fuel specialist, flight engineer, radio operator and low-level navigator. And in his spare time, he has to be proficient at flying the machine, too! You give him all that to do and the average conscientious "co" will attack the problem and do pretty well. However, as the AC, you need to have patience and a certain amount of trust that the copilot will accomplish the tasks properly and at the right time.

Don't jump in on frequency changes, checklists or systems malfunctions. Things may not go as fast as they would for you, but the copilot's learning. Besides, some dark and snowy night when you've got your hands full of sick machine, you're going to have to grit your teeth and trust the copilot to do it alone anyway, so you'd better let him practice while everything's ops normal. This is all tempered with judgment, of course, because as I've already mentioned, you have to be part IP and decide just how far to let the copilot go. I guess what I'm trying to say is that nothing destroys the initiative and confidence of a copilot faster than to have the left seater continually "helping out" by jumping in to remind him/her of required tasks. It's like fudging on headings on a VMC PAR—you're not helping anybody.

The last pearl of wisdom is to let the "co" fly the machine. *No,* belay that: *Make the "co" fly the machine!* Here's where the IP portion of your job again enters the scenario. If you want to think of it as life insurance, go ahead, because that's exactly what it is. You may be the AC that believes "it can't happen to me" but then a 40 pound vulture crashes through the windshield and lands in your lap. That's when it will be kind of nice to confidently sit back and let the "co" crack the 200 and ½ and bring you (and the rest of your mob) home.

To be able to do that, you had better start giving up as much stick time as the law allows until you see the desired level of proficiency emerge. Then, make sure there is more than adequate practice. Your experience will overcome rustiness in many cases, but often a copilot doesn't have the experience to draw from.

The crews I've flown with showed me one major point I feel is worth repeating. A crew aircraft is just that! Every single body on board has a place and function in the mission of the machine. The two critical elements of crew flying are communication and coordination. These include knowledge of and respect for everybody else's job, plus an atmosphere of cooperation. Crew flying should be a nonthreatening environment where the other crewmembers won't feel threatened when reminding the AC of an altitude or checklist item, and the AC needs to let everyone know he appreciates the reminder.

The copilot can be either an asset or a liability in tough situations involving mission accomplishment, despite weather, systems malfunctions or other adverse conditions! How they perform depends on how they're trained and supervised now. Good crews have killed themselves and/or destroyed valuable aircraft because of cockpit confusion. Coordinated crews reduce the odds of becoming a statistic!

courtesy of : Aerospace Safety

C.R. Terror

The Magic Major Meets *TMF*

"Come on, Sammy. Time waits for no man, ya know!" The Herky Honcho was raring to get going. "Look alive, m'lad. Let's kick the fires and light the tires. Er, I mean, let's not dally." C.R. had a yard-wide grin and an overflowing baby-blue B-4 ready to take home to the States. "Rote" had been fun, and C.R. had had his share. But the time had finally rolled around to bid Jolly Old England good-bye.

"Uh, Boss. Don't you want Ty to secure your B-4 back there on our baggage pallet?" asked the stalwart second-seater. "You know, we don't have very much room on the flight deck, what with the ACMs, and . . ."

"What ACMs, Sammy?" C.R. interrupted. "There aren't supposed to be any ACMs on our flight. Who are the varmints?" The usually calm aircraft commander was pulling about 20,000 inch-pounds of torque!

"Now just calm down, Boss. Calm down." Sammy's voice was as smooth as silk. "The ACMs are a couple of editors from *The MAC Flyer*. They're in Europe writing some stories on the way MAC does its mission over here and they're going to do one on our rotation back to the

States. Who knows? We may even find ourselves gracing the front cover of MAC's most illustrious publication."

C.R. immediately conjured up visions of his mug staring out from the front banner of *TMF*.

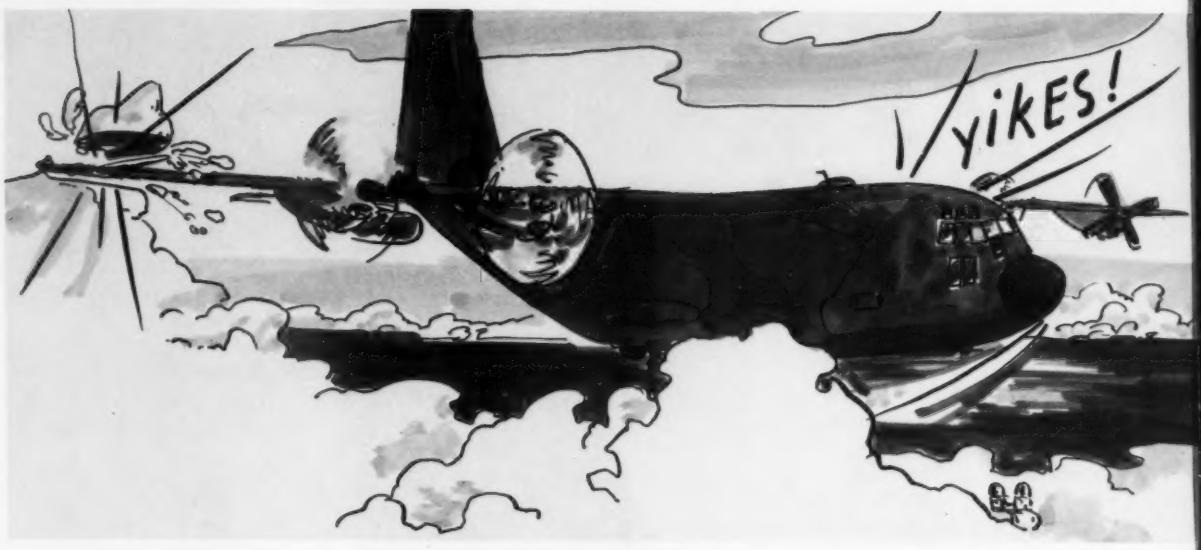
"The MAC Flyer, eh?" A smile once again appeared on the face of MAC's Most Senior Major. "I see! Well, we'll have to look sharp for our pax, er, ACMs, right Sam?"

"It wouldn't hurt, Boss," L.S. Sam replied. "You know, these guys from MAC headquarters are used to a little more spit and polish than the standard crew dog."

"Right you are, m'lad, and that's just what we're going to give 'em." The Loping Lothario of Airlift whirled around and, with a pendulum swing of his arm, launched the over-grossed B-4 through the crew entrance door. Unfortunately, he forgot to let go, and both bag and bagged ended up in a green and blue heap at the foot of the flight deck ladder.

"Help, Sam! My bag is attacking me!" C.R. called out in desperation.

"This could be a long trip



back home, nav," sighed Long Suffering Sam, "and besides, I told you he's never tried to single-handedly load his own bag or anyone else's."

"You could be right, Sam," responded Blinky as they both headed over to lend assistance to the Mental Midget.

A short while later, an Air Force-blue "bread truck" pulled up to the hardstand. C.R., for once, had planned ahead and positioned himself and his crew in front of the Herk.

"Atten-shun!" Smiling broadly, C.R. snapped his right hand to his ample forehead, nearly gouging out his eye in the process.

"Hi there, Major Terror," said the first flight-suited figure off the crew bus. "This is some greeting. I can see we're going to be in very capable hands on our trip back to the States. My name is Captain Coward and this is my colleague and associate editor, Captain Whitless. Would you like to see our crew orders?"

"Not necessary, sir," responded C.R., "not necessary at all. Are both of you ready to fly? Good! Me, too." And with that abbreviated greeting, C.R. turned in a flash, was up the crew entrance door and into his seat. "We'd best not tarry too long, you know," he yelled from the cockpit. "Controlled takeoff times and all that rot. Clear number three, Ty."

The two wordsmiths looked at each other in amazement. Luckily, Sam was calm and collected as usual.

Within minutes, C.R. had cranked and taxied the mighty Herk. He then made one of his usual "Terrorific Takeoffs." He held the straining '130 on the deck until 120 knots, lifted off, immediately raised the gear and flaps and let the speed build up until it reached 230 knots. Then he yanked the yoke back for all he was worth and "zoomed" the Herk, along with its hapless crew and helpless ACMs, right through their assigned altitude by 1,000 feet.

Soon, though, C.R. entered his cruise profile, much to the relief of his crew.

"I didn't think he'd *ever* fall asleep," remarked Max, finally reclining in his chair from a semi-crouching position close to C.R.'s shoulder. "I can breathe a little easier, now."

"Is he always like this?" Captain Whitless asked. "I mean, those were some pretty hairy happenings back there."

"Yeah," interjected Captain Coward, "I thought we might be able to write about the 'World's Greatest Aviator' like Colonel Fang had said. But I wasn't expecting anything like *this*!"

Sammy, Blinky and Max looked at each other in utter amazement.

"You mean, Colonel Fang told you about the Boss?" asked Blinky.

"That's right," Coward answered." All we wanted was a one-page filler article. I'm afraid with what we've seen, we'll have enough to write a feature-length story of 'how *not* to do it!'"

Sam, Blinky, Max and Ty sighed.

About eight hours later, after Sammy and Blinky had ably guided the Herk across the pond, C.R. was still deep in slumber.

"I think I'd better wake up the Boss, now," he began. "We're only 30 minutes out of Goose and the Boss specifically told me he wanted the approach and landing." Sammy shook C.R.'s shoulder gently. "Boss? Oh, Boss? It's time to wake up, Boss?" Sammy's "Method One" was not having the desired effect, so he went to "Method Two." As loudly as he could he yelled, "BOSS! THE BAR IS NOW OPEN!"

"What? Who? What? Where?" The Sultan of Sleep was slowly, if unsurely, coming back to life. "Man the lifeboats! Abandon ship! Women and children first; me next! Huh? Oh, Sammy. Did I doze off back there?"

"You could say that, Boss," Sam intoned. "Here's the approach plate for Goose. We're about 20 minutes out."

Rubbing the sleep from his eyes, C.R. tried to focus on the blue-and-white page of numbers.

"Uh, right," he began, nonchalantly tossing the approach book to his left. "This will be another of my usual sterling approaches with a feather-like touchdown. Any questions?"

"Will this be an ILS or GCA?" asked Sammy, as if on cue.

"Did you brief the minimums for the approach?" asked Max.

"Gentlemen! Gentlemen!" C.R. sleepily held up his hands. "Such minor details. Such trivialities. If you insist, we'll get radar vectors to a visual approach."

"Can't really do that, Boss," piped up Blinky. "Goose is reporting 500 overcast and 2 miles visibility. A snow shower just moved through the area, and they're reporting snow still on the runway."

"Oh, all right. Have it your way, Blinky," began C.R., "we'll shoot the ILS ending in a max effort. Is that okay with everyone?"

A short time later, after Sam, Max and Blinky had corrected C.R.'s altitude and heading control for the 20th time, the Fearsome Foursome and C.R. broke out of the overcast with the runway straight ahead.

"One hundred percent flaps, sil vouz plate, copilot"

"Roger, flaps moving to 100 percent, pilot, and the gear is down," responded Sam. The crew braced for the inevitable meeting of machine and ground. Miraculously, the touchdown was smoother than molasses in summer. The two editors looked at each other in amazement.

"No need to roll out to the end, so I'll just use maximum reverse now," said the Rogue of Reverse. Without hesitation, he pulled the power levers back to the stops, nearly bending them in the process. The Hamilton-Standards groaned loudly as they bit into the cold arctic air. All but number-one, that is. Suddenly the Herk was doing a not-so-slow pirouette in the middle of the runway, getting closer to a snow bank.

"Number-one's hung up," yelled Max, holding on to his seat for dear life. But seeing that C.R. was literally glued to the yoke, Max and Sammy yelled loudly and in unison, "Shut down number-one!"

"Number-one condition lever, feather!" called Sammy as he and Max then became a blur of hands, feet and arms, simultaneously pushing the throttles back to ground idle and pulling the condition lever to feather. Unfortunately it was too late, as the right wing tip took off the top foot or so of an imposing pile of snow, bending the sheet metal on the tip and breaking the position light in the process.

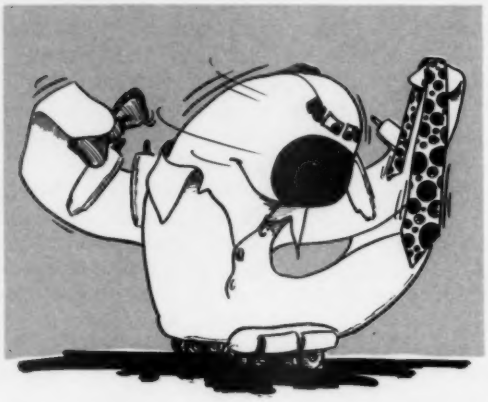
"Boy, that was a close one, eh boys?" remarked C.R. as he gently steered the Herk back to center line. "Like I always say, you can never be too careful." He then looked back to the bottom bunk at the two white-as-ghost images in flight suits. "You boys feel all right?"

"Oh, we feel fine," replied Captain Coward, "just fine. Our flight suits may need some cleaning, though."

"Did you guys get enough information for a story?" C.R. continued to probe.

"More than enough, sir," Whitless replied, some light pink returning to his face and his death grip easing on the edge of the bunk. "*more* than enough!"

Quick Stoppers

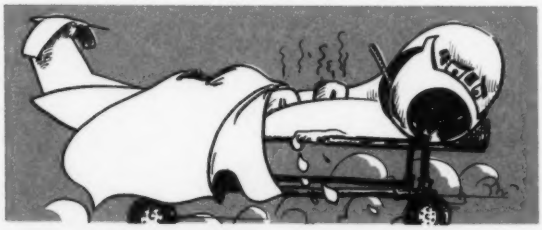


The Wrong Tie

There are all sorts of ties in the world of fashion; there are also ties in the flying world, too. Take for instance the case of the C-141. An instructor flight engineer was showing his young charge the "ropes" in and around the underdeck avionics compartment. The two engineers removed the protective panelling from, and were viewing the avionics equipment above, the radar receiver/transmitter (r/t). To their shock, they saw several flight control cables secured with plastic locking ties. One elevator and two rudder control cables were tied out of position with plastic ties secured to a floor bracket above the radar r/t, one elevator cable was tied to an oxygen line above the radar r/t, and this subsequently caused the elevator to chafe a ¼-inch deep groove in the support bracket of the avionics rack. Needless to say, the ties were removed and the cables inspected for broken strands. There was no damage, and the controls checked out good. Unfortunately, the ensuing investigation couldn't determine why, how or where the mysterious tie-down took place.

Freeze the Sim! I Want to Get Off!

Two hours after departure on an overwater channel mission, this Galaxy began losing hydraulic fluid from the number-one system. The crew added four gallons of fluid which kept the system operating, but within two hours, four more gallons were needed to prop up the failing system. Shortly after the second reservicing, the right wing bleed air duct indicated hot and the MADAR identified the source of the overheat as the number-four pylon. The crew accomplished the "Right Duct Overheat Checklist" and restored the system. Twenty-five minutes later, the number-one hydraulic system dumped quantity, repressurized and wouldn't depress. The pilot then directed shutdown of the number-one engine. A few minutes later, the number-three engine overheat light came on. The pilot retarded the affected throttle and the light went out. Then the number-three overheat and fire lights began to flash intermittently. Each time, the pilot extinguished the lights by a further reduction of the number-three throttle. Eventually, the pilot was unable to retard the throttle further and was forced to shut down the number-three engine. Five minutes later, the number-two hydraulic quantity started decreasing. The crew of the ailing C-5, having enjoyed all they could stand, made a successful emergency landing at an overseas civilian airport with numbers one and three engine shut down, the number-one hydraulic system depleted and the number-two hydraulic system quantity on the refill line. The maintenance folks traced the problems to a failed depressurization valve and a broken clamp on the fire sensing loop.



Inadvertent LAPES

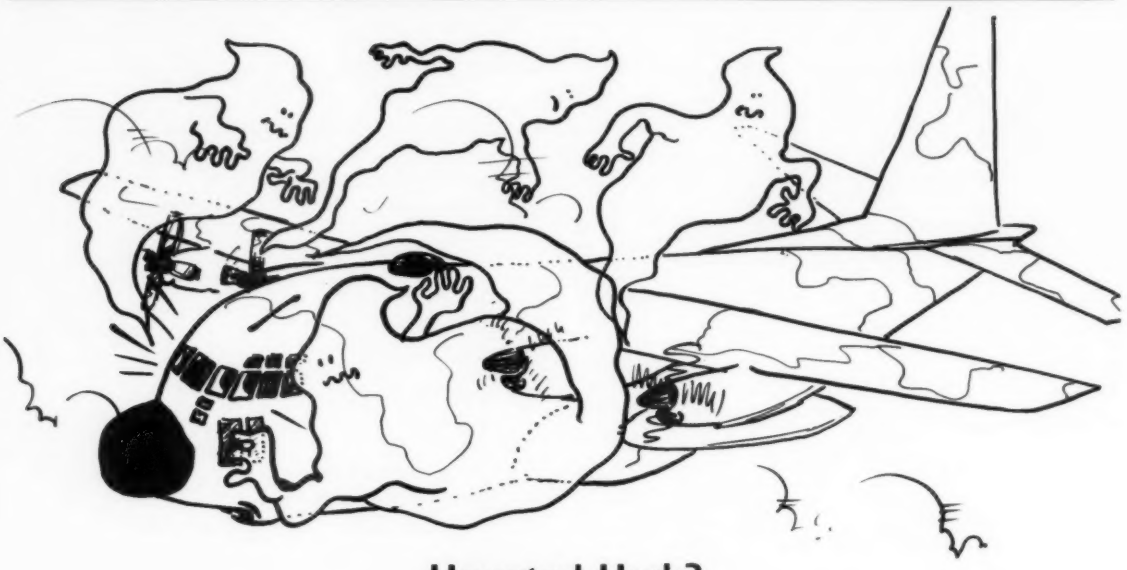
So, fellow Herky drivers and loaders, when was the last time *you* put an actual LAPES load down 300 yards short of the panels? Never, you say? Read on. There they were, the IP in the right seat playing copilot and an AC of the LAPES upgrade variety in the left seat. On the third pass across the EZ, they had planned to extract a 7,500-pound platform. Just prior to the aircraft's descent from 200 feet AGL, the right-seater pressed the ADS—aerial delivery system—button and turned on the copilot's red light. The drogue came out and deployed as usual, but so did the load, without anyone hearing or seeing "green light," and certainly without the right-seater even touching the jump switch to activate the system. Well, the mission terminated and the trouble-shooters came out to look over the LAPES kit—a likely place to start. But to their dismay, they couldn't find a single thing wrong.

Next day, same crew and same plane, but this time a drogue released late. Back on the ground, the maintainers focused their attention on the copilot's jump switch, which turned out to be the culprit. Seems the switch had failed internally.

Fuel-Leak Frights

The crew of this particular CH-3E was preparing to fly backup on a midair retrieval mission. But while the crew was performing an acceleration/deceleration check, the number-one engine flamed out. The flight engineer deplaned to have a look-see and found fuel running down the side of the craft. The crew immediately shut down the remaining engine and egressed. The maintenance inspection revealed a snap ring on the stator vane actuator had disengaged from the housing allowing fuel to leak from the actuator thereby causing the flame-out. The loose snap ring was the result of an improperly installed piston sleeve in the actuator housing. Maintenance personnel replaced the actuator and the aircraft flew without further incident.

Quick Stoppers



Haunted Herk?

Seems this particular C-130 was flying what was supposed to be a "routine" training mission. But the mission turned out to be anything *but* routine. For starters, following a practice extension of the ramp and door, the air turbine motor failed. No sweat, right? There's more! During climbout from a low approach, the engineer decided to test the wing leading edge and wheel-well overtemperature warning lights, just to make sure everything was on the up and up. But, as he activated the switch, numbers-three and four engine bogged down. The torques dropped to zero, the RPMs dropped below 60 percent and the aircraft, predictably, yawed to the right. Once the engineer released the test switch, the engines returned to normal operation. Following the incident, the crew selected mechanical governing on the props, placed the temperature datum system in null and deselected number two as the master engine.

After an uneventful landing, the homedrome maintainers sent a maintenance team to examine the "Haunted Herk." They found no cause for the strange happenings and the crew flew the C-130 on a one-time flight to home station—uneventfully. After an extensive evaluation they still couldn't locate the source of this phenomenon, so they scheduled a functional check flight.

During the flight, the crew leveled at a safe altitude and airspeed and activated the overtemperature test switch. As advertised, both engines on the right wing rolled back. Once the switch was released, the engines returned to normal operation. Next, the crew placed all props in mechanical governing and repeated the process with identical results. After landing, they once again activated the test switch, but this time, all engines operated normally. The maintainers, refusing to believe the Herk was possessed, kept looking for a logical explanation, eventually finding one.

Seems this bizarre behavior was caused by a stripped screw in the overhead panel which yielded a faulty ground connection. Wiring for the overheat test switch and the propeller pitch control circuits for numbers three and four engine all shared this faulty connection. The result? When the engineer activated the overheat test switch, he redirected voltage through the faulty grounding point to the feathering motors for numbers three and four engine and the props were driven toward feather. Once the switch was released, the engines returned to normal operation. See, there *are* no such things as ghosts!

After Deadlines

HH-60A NIGHTHAWK AVIONICS UNVEILED—The HH-60A is the first new helicopter developed for the Air Force since the Vietnam era. According to Lt. Col. Joe Perez, Chief, HH-60A Division of the Aeronautical Systems Division, the NightHawk was developed to perform combat missions in hostile territory. With the helicopter's state-of-the-art avionics and its proven airframe, the HH-60A will be able to complete combat rescue missions safely and undetected. The avionics package he spoke of includes 179 electronic units which allow the aircraft to fly at night and in limited adverse weather conditions. This requires the pilot manage a large amount of data. So, the new equipment was designed to reduce aircrew workload and allows the crew to be limited to a pilot and copilot, instead of the usual pilot, copilot and engineer complement. The entire cockpit is compatible with night vision goggles. Using a new panel design which features four side-by-side video displays, the innovative cockpit has only 15 instruments, eight of which are backup. Located around each of the cockpit video screens are control buttons used to select a variety of information, including flight control commands, attitude, altitude, groundspeed, available power and time and distance to preset destinations. Caution, warning and advisory alerts are automatically displayed. The aircraft is also equipped with a Forward Looking Infrared system (FLIR). The new aircraft was rolled out in January, 1984 and combines a modified Army UH-60A Black Hawk airframe with an upgraded powerplant, transmission and two jettisonable external fuel tanks.

CINCMAC COMMENTS ON AIRCREW QUARTERS AND SERVICES—A September message to all MAC Commanders from CINCMAC underscored the importance adequate crew rest facilities play in MAC's mishap prevention program. The message emphasized several points, among them that the senior MAC officer on station is responsible for insuring adequate facilities are available for *all* transiting MAC aircrews. This also includes planning for increased MAC traffic flow through bases and operating locations during exercises and contingency operations. If forecasts reveal an inadequate number of suitable quarters, the commander must work on alternative billeting arrangements. Aircraft commanders must also work with the senior MAC officer to insure flight safety problems don't arise due to inadequate facilities. This requires that all MAC ACs bring any messing or billeting problems to the attention of the senior MAC commander. Don't forget! Help resolve any problems you encounter by reporting them on the MAC Forms 43 and 54.

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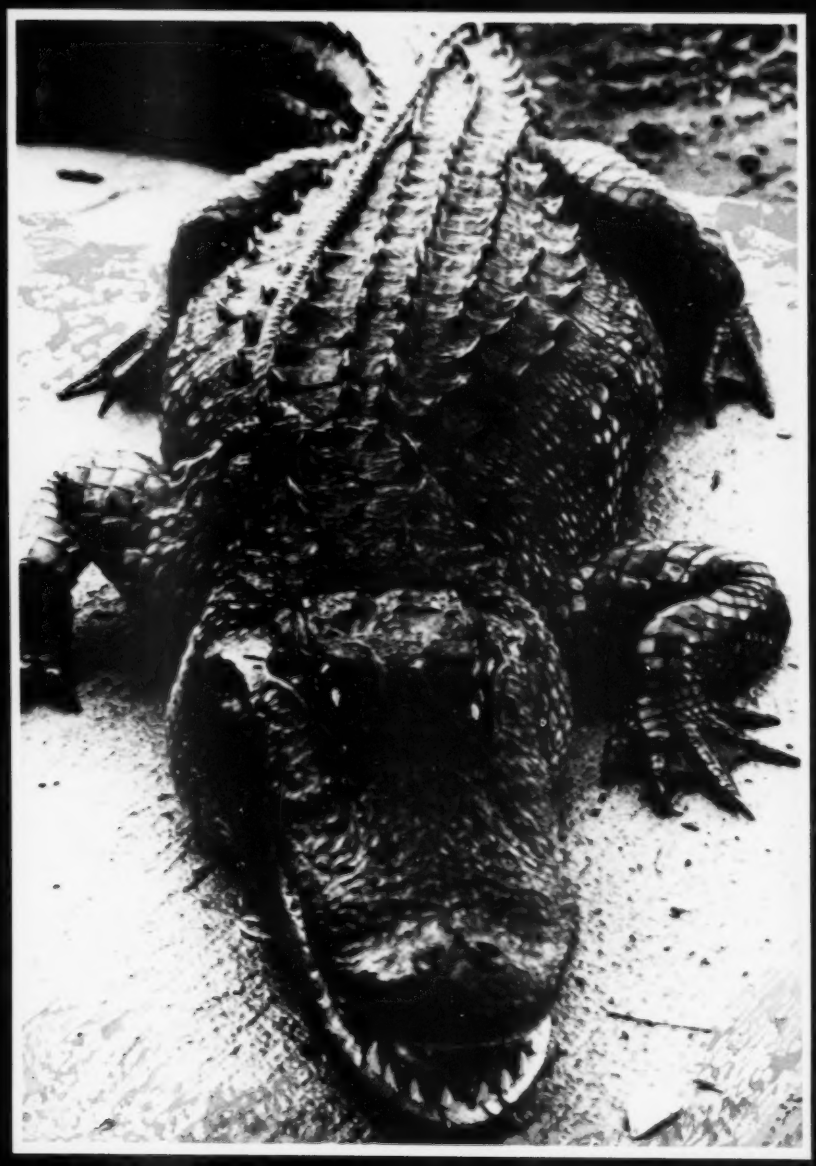
Touch'n Go



I said Q-3. Any other questions?